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MAY-05-2005 THU 04:30 PM LACASSE AND ASSOCIATES

FAX NO. 7038387684

P. 06

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09/942,319

In the Drawings:

None

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PAGE 6/15 * RCVD AT 5/5/2005 4:34:05 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/8 * DNIS:8729306 * CSID:7038387684 * DURATION (mm:ss):04:02

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This amendment is in response to the Examiner's Office Action dated 1/5/2005.

On page 2 of the office action, the examiner states that the claimed features: "interpolation vectors", "coordinate of vertices", "interpolated points", "graphic form", "sub-unit graphic forms", and "interpolation vectors that are normal-direction normal vectors of the shape to be realized" are not shown in the drawings. Applicant respectfully disagrees with the examiner as the specification and the figures as filed provide support for all of the mentioned claimed elements. First, the examiner is directed to the abstract of the application-as-filed where applicant specifically identifies "unit graphic forms or polygons" and "sub-unit graphic forms or subpolygons". Additionally, the examiner's attention is directed to figure 15 and the accompanying description on pages 18-21 of the application-as-filed, which depicts "unit graphic forms or polygons" and "sub-unit graphic forms or subpolygons" along with the rest of the above-mentioned claimed features. Hence, applicant respectfully requests the examiner to withdraw the objections to the drawings.

Applicant is appreciative for the recognized allowable subject matter. This response should obviate outstanding issues and make the remaining claims allowable. Reconsideration of this application is respectfully requested in view of the remarks that follow.

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Claims 1-7, 9-11, 13-20, 22-31, 33-35, 37-44, 46-55, 57-59, 61-68 and 70-73 are pending.

Claims 1, 11, 13, 14, 20, 25, 35, 37, 37, 44, 49, 59, 61, 62 and 68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhou et al. (USP 5600772) in view of Kunieda et al. (JP 51-75842A).

Claims 22-24, 46-48 and 70-73 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhou et al. in view of Kunieda, as applied to claims 1, 25 and 49 above, and further in view of Collins et al. (USP 57811714).

Claims 2-7, 9, 10, 15-19, 26-31, 33, 34, 39-43, 50-55, 57, 58 and 63-67 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

OVERVIEW OF CLAIMED INVENTION

The presently claimed invention provides for an image processing device and method for processing an image defined by a combination of unit graphic forms or polygons wherein the present invention provides an interpolated line completion unit and an interpolated point computation unit. The interpolated line completion unit determines an interpolated line, which is the line that interpolates a space between two vertices from an interpolation vector used to determine a line interpolating a space between a given vertex and another vertex among vertices of the unit graphic forms and from the coordinates of those vertices. The interpolated point computation unit determines, as vertices of sub-unit graphic forms or sub-polygons into which the polygons are to be split by the processing image device, interpolated points which are the points on the interpolated line. The interpolated line is a Bezier curve. The present invention

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also teaches an input unit, which is operated when input is given thereinto, a geometry processing unit, which reads data concerning the image from a recording medium and performs geometry processing, and a conversion unit which converts sub-unit graphic forms or sub-polygons into the subpolygons in the coordinate system of a two-dimensional output device.

In the Claims

REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 1, 11, 13, 14, 20, 25, 35, 37, 37, 44, 49, 59, 61, 62 and 68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhou et al. (USP 5,600,772) in view of Kunieda et al. (JP 51-75842A). Claims 22-24, 46-48 and 70-73 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhou et al. in view of Kunieda, as applied to claims 1, 25 and 49 above, and further in view of Collins et al. (USP 5,781,714). To be properly rejected under U.S.C. §103(a), each and every element of the claims must be addressed through known prior art or be recognized as an obvious variation thereof. Applicant contends that the Zhou et al. patent, the Kunieda et al. patent, or the Collins et al. patent either by themselves or in combination, fail to provide for many of the limitations of the applicant's claimed invention.

The patent to Zhou et al. teaches the use of chain-code flags and, more particularly, Zhou et al. teach the use of chain-code flags to indicate the collision of contours to help to avoid broken strokes and over-filling problems. In Zhou et al.'s patent, two memory buffers are used - one is a drawing buffer, while the other is for chain-code representation of the contours. Three steps are disclosed in the Zhou et al. patent. The first step draws the character outline on to the drawing buffer and generates the chain-code representation with flags to indicate contour collisions. The contours are then scanned one more time to add missing flags on the chain-code

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representation. Finally, the inside part of the contour on the drawing buffer is filled using the chain-code representations of the contour, to provide a filled character.

The patent to Kunieda et al teaches the use of a Bezier system to obtain digital audio waveform data in various sampling cycles by interpolating digital audio data with a Bezier curve and converting the data to analog data in an arbitrary sampling cycle.

The patent to Collins et al. teaches an apparatus and method for creating and playing back portable documents. According to Collins et al., text with a variety of different fonts can be accurately played back by a machine which does not previously have font descriptions and font interpreters for all of that document's fonts.

Independent claims 1, 25, and 49 of the applicant's invention, on the other hand, recite an image processing device that comprises an interpolated line computation means and an interpolated point computation unit. The interpolated line computation means determines an interpolated line that is a line that interpolates a space between two vertices from an interpolation vector used for determining a line that interpolates a space between a given vertex and another vertex of vertices of unit graphic forms and from coordinates of the vertices. The interpolated point computation unit determines, as vertices of sub-unit graphic forms, interpolated points that are points on the interpolated line. Applicant's invention allows an image of detailed shape to be generated from rough shapes.

In stark contrast, Zhou et al., discloses a data converting apparatus for converting outline represents of a character into its bit mapped form (see abstract). Fig. 2 of Zhou et al. shows a

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cubic segment for which a Bezier curve is used. There are control points P_1 and P_2 and endpoints P_0 and P_3 on the curve segment (also see column 5, lines 15-24 of Zhou et al.). Fig. 3 shows a Bezier curve that is divided into two segments at the mid point. New control points are calculated for each Bezier curve (see column 5, lines 34-37 of Zhou et al.).

Also, Fig. 4 of Zhou et al. describes a Chinese character that consists of disconnected components 1-0. Each component can contain one or more closed contours. Each closed contour is described by several Bezier curve segments (column 5, penultimate line to column 0, line 8).

Conspicuously absent in the citations or the entire Zhou et al reference is an interpolated line that is a line that interpolates a space between two vertices from an interpolation vector used for determining a line that interpolates a space between a given vertex and another vertex of vertices of unit graphic forms and from coordinates of the vertices.

Applicant agrees with the examiner that the limitation of determining (as vertices of sub-unit graphic forms) interpolated points that are points on the interpolated line is absent in the Zhou reference. But, applicant disagrees with the examiner that such limitations are remedied by the Kunieda reference. Specifically, the examiner relies on the Kunieda reference to teach "line and point interpolation". Kunieda, however, merely discloses a voice data generating device.

Specifically, the teachings of Kunieda deal with voice data that is digitized through an A/D converter and is later converted by a D/A converter prior to being reproduced. Kunieda et al. teach the generation of a gap between the voice data and analog data of the original voice data, since the D/A converter linearly interpolates between the voice data. For example, as in

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Fig. 4, a part of the original data that is designated by the 'a' is shifted to the location 'b,' when the linear interpolation is used.

Thus, a cubic Bezier equation is used to interpolate between the voice data to be reproduced." Fig. 5 of Kunieda describes a cubic Bezier curve that is used to make an approximation of the digital voice data.

Conspicuously absent in the citations or the entire Kunieda reference is the limitation of determining (as vertices of sub-unit graphic forms) interpolated points that are points on the interpolated line.

Since Kunieda et al. fails to disclose or suggest an interpolated point computation means for determining as vertices of sub-unit graphic forms, interpolated points that are points on the interpolated line, it would not have been obvious to apply the matters disclosed by Zhou in combination with the matters disclosed by Kunieda.

Hence, applicant respectfully requests the examiner to remove the 35 U.S.C. § 103(a) rejections with regards to independent claims 1, 25, and 49. Applicant wishes to note that the above-presented arguments substantially apply to dependent claims 2-6, 9-11, 13-20, 22-24, 26-31, 33-35, 37-44, 46-48, 50-55, 57-59, 61, 68, and 70-73 as they inherit all the limitations of the claims from which they depend.

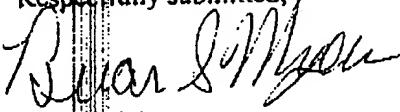
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09/942,319SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of applicant's presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration therof and early issuance is respectfully requested.

This amendment is being filed with a petition for an extension of time. The Commissioner is hereby authorized to change the petition fee, as well as any deficiencies in the fees provided to Deposit Account No. 50-1290.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact applicant's representative at the below number.

Respectfully submitted,



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May 5, 2005

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